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Financial Crises in Emerging Markets

Andrés Velasco*

Recent events in Mexico, East Asia, Russia, and Brazil have confirmed that a satisfactory explanation of emerging market financial and currency crises remains elusive. Not long ago, the prevailing view was that such crises were the inevitable outcome of ongoing fiscal imbalances coupled with fixed exchange rates. But this “first generation” of models of crisis, pioneered by Paul R. Krugman,¹ has fallen out of fashion, because many actual crises seem to lack the crucial fiscal disequilibria.

Maurice Obstfeld² proposed a “second-generation” view, in which central banks may decide to abandon the defense of an exchange rate peg when the social costs of doing so, in terms of unemployment and domestic recession, become too large. This change of perspective implied that crises may be driven by self-fulfilling expectations, since the costs of defending an exchange rate peg may depend on anticipation that the peg will be maintained. But Obstfeld’s emphasis on mounting unemployment and recession, while appropriate for the Exchange Rate Mechanism 1992 crisis, was at odds with the crises of Mexico in 1994 and of East Asia in 1997. Asian countries, in particular, were growing quickly until shortly before the currency meltdown.

Instead of fiscal imbalances or weakness in real activity, recent crises in emerging markets have revealed financial sources of vulnerability. In the Southern Cone of the Americas in the early 1980s, Scandinavia in the early 1990s, Mexico in 1995, and Asia

more recently, the currency crashed along with the financial system. Formal econometric work by Graciela Kaminsky and Carmen M. Reinhart³ suggests that banking troubles are good predictors of currency crises.

Almost all of the countries affected by the recent turmoil also had large ratios of short-term debt, public or private, to international reserves. In Mexico in 1995, Russia in 1998, and Brazil in 1999, the debt was the government’s; in Indonesia, Korea, and Thailand in 1997, the debt was primarily owed by private banks and firms. However, in each case, the combination of large short-term liabilities and relatively scarce internationally liquid assets resulted in extreme vulnerability to a confidence crisis. Furman and Stiglitz consider the ability of this variable alone to predict the crises of 1997 to be “remarkable.”⁴

Weak banks and large stocks of short-term debt are manifestations of a more general phenomenon: international illiquidity, defined as a situation in which a country’s consolidated financial system has potential short-term obligations in foreign currency that exceed the amount of foreign currency to which it has access on short notice. Illiquidity is a key problem for emerging market countries because of their limited access to world capital markets. If banks in mature economies face a liquidity problem, as long as they are solvent they are likely to get emergency funds from the world capital markets. This seldom occurs in emerging economies: a private bank in Bangkok or Mexico City will get many international loan offers when things go well, and none when the bank is being run on by depositors.

Illiquidity is certainly not necessary for currency crashes to occur. The European Monetary System troubles of the early 1990s, for instance, had more to do with governments’ desire

to fight unemployment than with any difficulties in servicing short-term obligations. Nevertheless, illiquidity comes close to being sufficient to trigger a crisis. The options left after creditors lose confidence, stop rolling over, and demand immediate payment on existing loans—whether to the private sector as in Asia or to the government as in Mexico and Brazil—are painfully few. The collapse of the currency or the financial system, or even of both, is the likely outcome.⁵

Take the case of Asia after it was hit by what Guillermo A. Calvo⁶ terms the “sudden stop syndrome”: a massive reversal of capital inflows in the second half of 1997 that amounted to 3.6 percent of gross domestic product.⁷ Proliferating bankruptcies and payment moratoriums weakened bank balance sheets just as panicky domestic depositors were withdrawing their funds. Governments attempted to help by providing liquidity and moderating the rise in interest rates, but the additional domestic currency quickly found its way back to the central bank, causing a fall in reserves and an eventual collapse of the peg.

Several recent papers I co-authored with Roberto Chang of the Federal Reserve Bank of Atlanta and one written with Dani Rodrik of Harvard University⁸ try to build a new class of crisis models that places financial fragility and illiquidity at the center of the story. We are not alone in trying to develop such a “third generation” of currency crisis models.⁹

The Basic Analytical Story

Any model in which financial institutions issue demandable debt as a liability, therefore placing themselves in a potentially illiquid position, is useful for studying crisis. Chang and I¹⁰ start from a version of the cele-

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brated banking model by Bryant and by Diamond and Dybvig.¹¹ Banks are essentially transformers of maturity that take liquid deposits and invest part of the proceeds in illiquid assets. In doing so, they pool risk and enhance welfare, but they also create the possibility of self-fulfilling bank runs.

While the Diamond-Dybvig model focuses on the microeconomics of banking, our version embeds banks into a small, open economy. This extension brings three macroeconomic/international issues to the fore. First, in an open economy, the ability of governments to come to the rescue of banks under attack is severely limited by the availability of international reserves. With capital mobility, printing unbacked money can only cause the exchange rate to crash, as both standard theory and the experience of Asia suggest.

Second, domestic bank runs, understood as a panic by depositors in the banking system, may interact with panics by foreign creditors of the system. The nature of this interaction depends, in particular, on the structure of international debt and on how strongly banks can commit to repay their international obligations. For instance, Chang and I¹² identify situations in which a run by domestic depositors can occur in equilibrium if and only if foreign creditors run at the same time. Such results seem relevant to recent events.

Third, real exchange depreciation may both cause bank runs and multiply their deleterious real effects. The logic is circular: if bank runs cause the real exchange rate to depreciate, then producers of nontradable goods may go bankrupt if these firms had borrowed from local banks, the bank's liquidation value would have declined, and a run would have been even more possible.

Choosing Debt Maturity

Domestic banks and firms have a choice about the maturity of the loans they contract abroad. How do

we understand the preponderance of short-term borrowing in most of the emerging economies that recently crashed? A common answer is that short-term debt "is cheaper" than long-term debt. But the term structure of interest rates is determined by the riskiness of different debt maturities, and these should in turn reflect the possibility of a crisis associated with illiquid portfolios. Consequently, the role of short-term debt in generating a crisis can only be analyzed in a model of the simultaneous determination of debt maturity and the term structure of interest rates.

In my papers with Chang and with Rodrik, we build such a model.¹³ We find that the share of short-term debt that is optimal *ex ante* depends on various factors, such as the extent to which early investment liquidation is costly; the probability that a run on short-term debt will take place if one is possible (something that depends, among other things, on the borrowing country's previous credit record); and the likelihood and costliness of attempted debt defaults.

This work focuses on the undistorted optimal choice of maturity. However, many plausible distortions could lead local borrowers to prefer short-term loans beyond the level that is socially desirable, including biases in the local tax and regulatory structure, informational limitations that prevent foreign lenders from distinguishing across borrowers from the same country, and the moral hazard caused by the expectations of government bailouts. In that last case, we argue, Chilean-style taxes on short-term capital movements may be desirable.

The Role of the Exchange Rate Regime

Chang and I show that the macroeconomic effects of creditor runs depend crucially on the monetary and exchange rate policy in place.¹⁴

The combination of fixed rates and a central bank that stands ready to act as a lender of last resort is predictably troublesome: bank runs are avoided only at the cost of causing currency runs.

Currency boards that fix the exchange rate and prevent central banks from issuing domestic credit indeed can prevent bank crises from expressing themselves in the currency market. Yet, precisely because a currency board prevents the central bank from acting as a lender of last resort, it may render fractional reserve banks endemically unstable. Creating a "fiscal war chest" to be used at times of bank trouble is an alternative, but one that has efficiency costs.

Greater exchange rate flexibility may be a better alternative. For example, a regime in which bank deposits are denominated in domestic currency, the central bank stands ready to act as a lender of last resort, and exchange rates are flexible, may help to forestall some types of self-fulfilling bank crises. The intuition for this is simple. An equilibrium bank run occurs if each bank depositor expects that others will run and exhaust the available resources. Under fixed rates, those who run to the bank withdraw domestic currency, which they in turn use to buy hard currency at the central bank. If depositors expect this sequence of actions to cause the central bank to run out of dollars or yen, then it is a best response for them to run as well, and the pessimistic expectations become self-fulfilling. On the other hand, under a flexible-rates regime with a lender of last resort, there is always enough domestic currency at the commercial bank to satisfy those who run. Since the central bank is no longer compelled to sell all the available reserves, those who run will face a depreciation, while those who do not run know that there will still be dollars available when they want

to withdraw them at a later date. Hence, running to the bank is no longer a best response; pessimistic expectations are not self-fulfilling; and a depreciation need not happen in equilibrium.

This makes a strong case for flexible exchange rates, but there are caveats. One is that such a mechanism can protect banks against self-fulfilling pessimism on the part of domestic depositors (whose claims are in local currency), but not against panic by external creditors who hold short-term IOUs denominated in dollars. To the extent that this was the case in Asia, a flexible exchange rate system would have provided only limited protection.¹⁵ In addition, proper implementation is subtle. If flexible exchange rates are to be stabilizing, they must be part of a regime in which agents take into account the regime's operation when forming expectations. Suddenly adopting a float because reserves are dwindling, as Mexico did in 1994 or as several Asian countries have done recently, may have the opposite effect by further frightening concerned investors.

¹ P. R. Krugman, "A Model of Balance of Payments Crises," *Journal of Money, Credit, and Banking* (1979).

² M. Obstfeld, "The Logic of Currency Crises," *Cahiers Economiques et Monétaires*, no. 43 (Paris: Banque de France, 1994), pp. 189–213.

³ G. L. Kaminsky and C. M. Reinhart, "The Twin Crises: The Causes of Banking and Balance of Payments Problems," *International Finance Discussion Paper No. 544*, Board of Governors of the Fed-

eral Reserve System, March 1996.

⁴ J. Furman and J. E. Stiglitz, "Economic Crises: Evidence and Insights from East Asia," *Brookings Papers on Economic Activity*, 1998.

⁵ I say "close to sufficient" because, as Obstfeld and Rogoff (*Journal of Economic Perspectives*, 9, no. 4, Fall 1995, pp. 73–96) have stressed, any central bank that has enough resources to buy back the monetary base is capable, in a technical sense, of maintaining an exchange rate peg. But, as the authors recognize, in situations of financial distress, the de facto claims on central bank reserves may be as large as or larger than M2. In those cases, as we later study in detail, maintaining the peg becomes a more treacherous task.

⁶ G. Calvo, "Balance of Payments Crises in Emerging Markets: Large Capital Inflows and Sovereign Governments," *University of Maryland, Discussion Paper*, March 1998.

⁷ The figure is from S. Radelet and J. Sachs, "The Onset of the Asian Financial Crisis," *NBER Working Paper No. 6689*, August 1998.

⁸ R. Chang and A. Velasco, "Financial Fragility and the Exchange Rate Regime," *NBER Working Paper No. 6469*, March 1998; "Financial Crises in Emerging Markets: A Canonical Model," *NBER Working Paper No. 6606*, June 1998; "Banks, Debt Maturity, and Financial Crises," forthcoming, *Journal of International Economics*; "Liquidity Crises in Emerging Markets: Theory and Policy," *NBER Working Paper No. 7272*, July 1999; and D. Rodrik and Velasco, "Short-Term Capital Flows," paper presented at Annual Bank Conference on Development Economics, World Bank, 1999.

⁹ Other papers in the same line of research include: E. Detragiache, "Rational Liquidity Crises in the Sovereign Debt Market: In Search of a Theory," *IMF Staff Papers*, 43, no. 3 (1996); I. Goldfajn and R. Valdes, "Capital Flows and the Twin Crises: The Role of Liquidity," *Working*

Paper 97–87, *International Monetary Fund*, July 1997; Calvo, "Balance of Payments Crises in Emerging Markets" and "Varieties of Capital Market Crises," *Working Paper No. 15*, *Center for International Economics*, University of Maryland, 1995; O. Jeanne, "International Liquidity and the New Architecture," *International Monetary Fund*, mimeo, 1998; P. Aghion, P. Bacchetta, and A. Banerjee, "Capital Markets and the Instability of Open Economies," *Working Paper No. 9901*, *Studienzentrum Gerzensee*, 1999; and Krugman, "Balance Sheets, the Transfer Problem, and Financial Crises," paper presented at MIT, 1999. The policy implications of the liquidity approach are stressed by M. S. Feldstein, "A Self-Help Guide for Emerging Markets," *Foreign Affairs (March–April 1999)*; and Chang and Velasco, "Liquidity Crises in Emerging Markets."

¹⁰ Chang and Velasco, "Financial Crises in Emerging Markets."

¹¹ J. Bryant, "A Model of Reserves, Bank Runs, and Deposit Insurance," *Journal of Banking and Finance*, no. 4 (December 1980); D. Diamond and P. Dybvig, "Bank Runs, Deposit Insurance, and Liquidity," *Journal of Political Economy*, 91 (1983), pp. 401–19.

¹² Chang and Velasco, "Financial Crises in Emerging Markets."

¹³ Chang and Velasco (forthcoming), *Journal of International Economics* analyze a domestic bank's choice of foreign debt maturity; Rodrik and Velasco, "Short-Term Capital Flows," focus on the choice faced by domestic nonfinancial firms.

¹⁴ Chang and Velasco, "Financial Fragility and the Exchange Rate Regime."

¹⁵ Floating is not totally useless in this case, for panic by foreign creditors could perfectly well be triggered by a run by domestic depositors, with the outcome self-fulfilling. For details on this line of argument, see Chang and Velasco, "Financial Crises in Emerging Markets."

